

# BROOKHAVEN NATIONAL LABORATORY

# OCCUPATIONAL HEALTH AND SAFETY GUIDE

## DIVING

1.12.1

### Table of Contents

	<u>Page No.</u>
I. INTRODUCTION .....	3
II. SCOPE .....	3
III. DEFINITIONS .....	3
IV. RESPONSIBILITIES .....	4
v. REQUIREMENTS .....	6
A. Qualification of BNL Divers .....	6
1. Wading/Swimming .....	6
2. Skin Diving .....	6
3. Scuba Diving .....	6
4. Diver's Health Examination .....	7
5. Non-BNL Equipment .....	7
6. Air Quality .....	7
B. Operations .....	8
1. Diving Plan .....	8
2. Diving Log .....	8
3. Equipment Log .....	8
4. First Aid Supplies .....	8
5. Communications .....	8
6. Emergency Procedures .....	9
7. Scuba Diving Limits .....	9
8. Wading .....	9
9. Buddy System .....	9
10. Diving Tender .....	9
11. Diving About Piers .....	9
12. Special Diving Situations .....	9
13. Decompression .....	9
14. Flotation Gear .....	10
15. Diver's Flag .....	10
16. Small Craft .....	10
17. Work Platform .....	10
18. Quick Release Devices .....	10
19. Equipment, Maintenance and Records .....	10

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Table of Contents (Cont'd)

	<u>Page No.</u>
APPENDIX	
A. SCUBA - Manuals .....	11
1. U.S. Diving .....	11
2. Safe Practices .....	11
B. Certification .....	11
1. Scuba .....	11
2. Categories .....	13
3. Maintenance of Certifications .....	14
4. Diver's Health Examination .....	15
5. Swimmer Skills .....	18

## I. INTRODUCTION

Research and development activities associated with BNL programs require a safety guide for persons who must enter the water with or without diving equipment.

## II. SCOPE

This Guide establishes procedures, qualifications and responsibility of all personnel associated with underwater operations, under the jurisdiction of BNL. It ensures that all diving is conducted in a manner most likely to minimize accidental injury or occupational illness. It also provides regulations and standards for selection, training, certification, supervision and equipment of BNL divers.

## III. DEFINITIONS

A. Decompression Table - A schedule of specific procedures for a given combination of depth, time, and breathing gas.

B. Dive Location - The location from which a diving operation is conducted.

C. Diving Board - A group appointed by the Department Chairman and composed of personnel involved in diving operations, experienced divers and a representative from the Safety and Environmental Division. The group shall be appointed by the Department Chairman for the purpose of reviewing special diving situations requiring departures from this Guide.

D. Diver's Flag - An international flag "A" (white and blue pennant) displayed at the dive location.

E. Diving Free - A descent beneath the surface of the water in which no equipment, such as fins, masks, or scuba is used.

F. Diving Tender - A person familiar with safe diving practices.

G. FSW - Feet of seawater.

H. Lock-Out Submersibles - An underwater platform with a compartment(s) maintained at one atmosphere.

I. Principal Investigator - Chief scientist in charge of the scientific crew and on-the-scene representative of the Department Chairman.

J. Saturation Dive - The state of dissolved gases in the tissue of a diver. Under a "saturation" condition a diver's compression time does not increase with time spent for a given depth.

K. SCUBA - Self-contained underwater breathing apparatus.

L. Standby Diver - A diver at the dive location ready to go to the aid of another diver.

#### IV. RESPONSIBILITIES

A. Department Chairmen/Division Heads are responsible for ensuring **implementation** of this Guide. The Department Chairman/Division Head may appoint a "Diving Board" to oversee **all diving** for the department. The Diving Board will review safety requirements on a case by case basis and may specify departures from this Guide for particular cases. Such departures must be approved by the Department Chairman.

B. The Division of Contracts and Procurement is responsible for the **selection** of contract divers involved in intermittent operations for continuing scientific programs. Specifically, the Division of Contracts and Procurement shall:

1. Insure the qualifications of divers for eventual selection. Selection shall be consistent with the requirements of this Guide.

2. Make arrangements for the contract to secure divers which are proper for the particular mission desired.

3. Coordinate diver firm selection with the appropriate department.

C. Safety and Environmental Protection Division will assist the departments in all matters **concerning** safe diving operations. Specifically, it shall:

1. Provide an ex officio member of the Diving Board.

2. Provide assistance for interpretation of this Guide.

D. Principal Investigator is responsible for the direct implementation of this Guide. Specifically the Principal Investigator shall:

1. Brief all concerned personnel regarding the scientific requirements of the diving work.

E. Diving Board (if appointed) is responsible for ensuring implementation of this Guide. Specifically, the Diving Board shall:

1. Review diving plans requiring specific departure from this Guide.

2. Advise the Department Chairman of any departure from this Guide along with the recommendations for approval/disapproval of the diving plan.

Diving Supervisor will maintain or ensure that all records are maintained pertaining to diving operations, such as maintenance, spare parts,

repairs, tests, divers certifications, etc. Specifically the Diving Supervisor shall:

1. Assure that trained, currently certified and qualified divers are available to act as chief divers for all dives.
2. Develop and maintain a "Safe Practices - Diving Manual" (see Appendix A-2).
3. Develop and implement a preventative maintenance program.
4. Ascertain that diver certification requirements of any organization are at least as stringent as those listed in Appendix B.1.
5. Require Master of vessel to obtain additional emergency equipment subject to the mission of vessel and personnel aboard.

F. Chief Diver will be required to be present at all operations and is responsible for the safe conduct of the divers. (The Chief Diver could act as the standby diver.) Specifically, the Chief Diver is responsible for:

1. Directing diving operations at scene.
2. Ensuring that only qualified divers are utilized.
3. Ensuring that personnel engaged in diving operations, are competent to perform their work assignments in a safe manner.
4. Recording inspection, maintenance and repairs of diving equipment, in the "Equipment Log." (See V-B-3.)
5. Ensuring that all diving gear and accessory equipment be maintained in a safe operating condition.
6. Implementing the diving plan as defined in V-B-1.
7. Maintaining a diving log. (See V-B-2.)
8. Assuring that medical certification of divers is current. (Refer to V-A-4.)
9. Deferring to the Master in matters of vessel and personnel safety\*
10. In an Emergency, stand by to render assistance as required.

G. Master. The Master has ultimate responsibility for the safety of all personnel aboard the vessel. Refer to Occupational Health and Safety Guide 1.12.0 "Marine Safety" for further information.

H. Divers are responsible for the following:

1. Obtaining and maintaining certification.
2. Inspecting and testing their equipment.
3. Following established procedures as outlined in the "Safe Practices-Diving Manual."
4. Working only when the Chief Diver has been designated.
5. Refusing to dive if in their judgement conditions are unsafe or unfavorable, or if, by diving, they would violate the dictates of their training or the intent of this Guide.

V. REQUIREMENTS

A. Qualification of BNL Divers - Employees of BNL desiring diver qualifications to participate in BNL diving projects will be certified by BNL. The guide for certification is promulgated in Appendix B of this Guide. The employee shall meet the following requirements:

1. Wading/Swimming

- a) Demonstrate general swimming ability.

2. Skin Diving

- a) Possess Red Cross "Swimmers" Certification or equivalent (Appendix B-5).

b) Satisfactorily complete BNL cardiopulmonary resuscitation and first aid courses or equivalent.

c) Swim underwater 100 feet without surfacing for breath; propulsion only with fins.

d) Demonstrate skin diving proficiency with normal equipment to the satisfaction of the Diving Supervisor.

3. Scuba Diving

- a) Demonstrate proficiency for skin diving. (V.A.2.)

b) Swim underwater 100 feet without surfacing for breath; propulsion only with fins.

c) With face mask removed, breathe from SCUBA mouthpiece without drawing water up the nose.

d) Clear flooded face mask (without purge device) and regulator hose/mouthpiece. When two-hose regulator is involved, use proper procedure for clearing both with and without check-valves in the mouthpiece.

e) Ditch SCUBA, face mask, and fins at a depth 10 to 15 feet, and make free-ascent (exhaling) to surface. Return and replace all equipment.

f) Share mouthpiece with a diving partner ("buddy breathing").

g) Exchange SCUBA with a diving partner, at a depth of about 10 feet.

h) Enter water wearing SCUBA, face mask, and fins by jumping in feet first and by rolling in backwards.

i) Exhaust air supply from SCUBA cylinder.

4. Divers Health Examinations. Diver's will undergo a required diver's physical examination in accordance with Appendix A. These health examinations must be repeated annually for as long as the diver remains active in the BNL diving program. A physical examination is required following major illness or injury before diving is resumed.

5. Non BNL Equipment. The Diving Supervisor or the authorized representative shall approve/disapprove all privately owned scuba equipment used in diving.

6. Air Quality. The air discharged from each compressor used for charging scuba cylinders shall be analyzed every six months, for presence of contaminants. The Compressed Gas Association standards, Classification Type II, set by the current U.S. Navy Diving Manual shall be observed in establishing the purity of air for diving purposes. Presently these standards are:

a) Oxygen concentration required - 20 to 22% by volume,

b) Maximum carbon dioxide allowable - 0.10% (1000 ppm),

c) Maximum carbon monoxide allowable

- for dives not requiring decompression - 0.002% (20 ppm),

- for dives requiring decompression - 0.001% (10 ppm),

d) Maximum oil vapor allowable - 5 mg/cubic meter,

e) Gross moisture, dust, noxious odor or other foreign matter allowable - none.

Records of air contamination analyses, compressor operation, maintenance, and filter changes shall be maintained by the Diving Supervisor in the "Equipment Log."

## B. Operations

### 1. The Diving Plan will include a review of:

- a) Qualifications of personnel,
- b) Scheduling and diving mode,
- c) Dive team assignments,
- d) Limitation of weather and sea conditions,
- e) Equipment requirement, quality and need for thermal gear,
- f) Local diving conditions,
- g) Dangerous marine life,

h) Emergency and safety procedures including specific contacts for decompression chamber use.

2. Diving Log. A log shall be maintained and shall include: names of divers, date, time and location of dive, name of vessel (if used), purpose of dive, approximate time under water, and a report of any accident or potentially hazardous incident.

3. Equipment Log. Log shall provide standard procedures for testing, cleaning, and calibration of diving equipment such as air compressors, air systems, tanks, hoses and fittings. In addition, an entry shall be made of all maintenance to diving equipment as follows:

a) Repairs performed on compressors and air systems including such information as belt and oil changes, replacement of engine parts and filters.

b) Test and repair of gas supply hoses and fittings, and results of such tests.

c) Test, repair and calibration of depth gauges.

d) Identification of equipment or part replaced or repaired date on which work was performed and the individual performing the work.

4. First Aid Supplies. A first aid kit appropriate for the diving operation as recommended by BNL Industrial Medicine Clinic shall be available at the dive location in addition to an American Red Cross standard first aid book.

5. Communications. All diving operations require direct communication without aid by means of a two-way radio.



## 6. Emergency Procedures for Divers

a) The best procedure for seeking medical aid in most emergencies is to contact the Coast Guard, Police (Suffolk County telephone 911) or local fire department, which can then bring in or coordinate other forms of aid, e.g. doctor, ambulance, helicopter, transportation, as needed.

b) When a search is required for the victim in a pond or inland waters, the local police and fire departments should be called. If the diving operation is at sea, and search assistance, medical advice, or pickup of the victim is required, the U.S. Coast Guard should be radioed on the U.S.C.G. Distress Frequency.

7. SCUBA Diving Limits. Diving shall not be conducted at depths deeper than 130 FSW. At depths deeper than 100 FSW a decompression chamber shall be ready for use at the dive location. In addition, **diving** shall not be conducted against current exceeding one (1) knot unless divers are line tended.

8. Wading. **C**lose observation must be maintained with people who are wading. Potential hazard is stepping off a ledge into deep water such as along a dredged channel, or a sand bar along an inlet or race.

9. Buddy system of diving/swimming. No solo scuba diving is permitted, unless a diver is line-tended from the surface. Scuba dives will **normally** require at least two divers operating as a team, each diver who is submerged remaining within close visual contact or easy reach/recovery of his partner at all times. Exceptions to the no-solo-diving rule would arise when the life of another person may be imperiled, or the safety of a vessel may be in question.

10. Diving Tender. At each dive site there shall be a third person familiar with diving operations on the surface who is serving as a diving tender. The tender monitors the divers' activities as far as possible, cautions marine traffic which may approach the diving area, and stands by to render **assistance** as required. The tender will also monitor the divers' submersion times.

11. Diving near or under the piers. No diving is permitted under or adjacent to the piers without prior notification of a responsible person with authority for the pier, and the watch officers of all vessels at, or scheduled to arrive at the pier during the conduct of the diver. When divers are in the water, a standby diver will be stationed on the pier or in a nearby small boat to warn away approaching marine traffic.

12. Special diving situations. Special consideration shall be given in the project planning stages. Saturation dives, excursions from lock-out submersibles, diving with surface-supplied air, and diving with breathing mediums other than air are examples.

13. Decompression requirements. All divers will follow the currently authorized U.S. Navy Decompression Tables and Procedures, unless other

procedures **are** authorized. (See Emergency Procedures for Divers, Section V.B.6.)

14. Flotation gear. Scuba divers shall be equipped with a suitable gas-inflatable life preserver.

15. Diver's flag. A rigid replica of the International Code Flag "A" will be prominently displayed as close as possible to the dive location. The flag shall be not less than one meter in height, be displayed in a manner which allows all around visibility and be illuminated during night operations.

16. Small Craft. A properly-manned small craft, preferably powered, shall tend the divers when scuba diving occurs away from a dock or shore, or whenever diving from a large vessel at sea. Important factors determining the nature of this surface support include current or wind action which may separate the divers from their base and the availability of means for the divers to hold themselves at the surface or to leave the water quickly. When a power boat too large to be rowed, and without an alternate source of power is used as a tender, a skiff or life raft should be immediately available to retrieve divers in the event of power failure on the tender.

17. Work Platform. Means of entry and exit for divers shall be provided. Such means might range from a stable work platform to a ladder and they shall extend below the water.

18. Quick Release Devices. All scuba tank harnesses and weight belts shall have quick release capability to permit immediate jettisoning of each unit. The quick release device shall operate easily with either hand (even if gloved).

19. Equipment Maintenance and Records

a) Regulator maintenance.

Under the direction of the Diving Supervisor, scuba regulators shall be inspected at yearly intervals for obvious mechanical defects, and overhauled by a competent mechanic when necessary. A record of such inspections and overhauls shall be maintained in the "Equipment Log."

b) Cylinders.

Compressed gas cylinders subject to service in diving must be hydrostatically tested in accordance with I.C.C./D.O.T. Regulations, and bear a valid test date. A record of these cylinders and their most recent test dates should be maintained in the "Equipment Log."

## APPENDIX

## A. SCUBA Manuals

1. U.S. Navy Diving Manual. All BNL vessels and diving locations should have a current edition of the U.S. Navy Diving Manual.
2. Safe Practices-Diving Manual. A manual shall be developed and maintained on a current status and shall be made available at the dive location to each dive team member. Primarily, it shall provide for the safety and health of employees engaged in diving operations and it shall include, but not necessarily limited to, the following:
  - a) General, specific and emergency procedures for all swimming and diving modes.
  - b) Checklists and safety procedures for diving operation.
  - c) Equipment procedures and checklists.
  - d) Emergency procedures for fire, equipment failure, adverse environmental conditions, and medical illness and injury.
  - e) A list of available sources of emergency aid, equipment, and professional assistance, with their phone numbers and instructions for establishing contact.
  - f) Inspection **and** maintenance of regulators.
  - g) Test dates of compressed gas cylinders.

## B. Certification

1. SCUBA. There are a number of organizations that conduct SCUBA diving certification programs, for example, the National Association of Underwater Instructors (**NAUI**), Professional Association of Diving Instructors (**PADI**) and the National Association of Skin Divers' Schools (NASDS).
  - a) Each prospective diver should receive at least 10 hours for classroom instruction including but not limited to the following:
    - 1) Diving Physics
      - (a) Pressure
      - (b) Buoyancy
      - (c) Diving Gases
      - (d) Gas Laws

aid)

- (e) Thermal Conductivity
- (f) Light and Sound
- 2) Diving Physiology and Medical Aspects (including first aid)
  - (a) Hypoxia - Breath Holding
  - (b) CO<sub>2</sub> Toxicity
  - (c) CO Toxicity
  - (d) O<sub>2</sub> Toxicity
  - (e) Effects of Pressure During Ascent and Descent
  - (f) Lung Overpressurization Accidents
  - (g) Decompression Sickness
  - (h) Flying After Diving
  - (i) Nitrogen Narcosis
  - (j) Heat Loss
  - (k) Exhaustion
  - (l) Hyperpnea
  - (m) Panic Syndrome
  - (n) Drowning
  - (o) Cardiopulmonary Resuscitation
- 3) Deep, Decompression, Repetitive, and Altitude Diving
- 4) Diver Equipment Use and Maintenance
- 5) Diving Environments and Marine Life
- 6) Underwater Communications
- 7) Light Salvage
- 8) Search and Recovery
- 9) Dive Planning

b) At least 15 hours of in-water training, using scuba, by a certified instructor should be given the prospective diver. This training should include, but need not be limited to the following:

- 1) Drown Proofing
- 2) Diver Equipment
- 3) Buoyancy Control
- 4) Controlled Emergency Free Ascent
- 5) Open Water Entries and Exits
- 6) Buddy Breathing
- 7) Limited Visibility Diving
- 8) Underwater Navigation
- 9) Search and Recovery
- 10) Scuba Rescue
- 11) Gear Removal and Replace in Water
- 12) Full-Gear Surface Snorkel Swimming
- 13) Weight Belt Ditching

e) A minimum of two open water dives should be performed by the prospective diver under conditions and at depths as similar as possible to those encountered during anticipated operational dives.

## 2. Category of Certifications

a) Provisional SCUBA Diver Permit - Upon satisfactory completion of the two-week period of formal instruction in basic SCUBA diving, a candidate will be issued a Provisional SCUBA diver permit. A holder of this permit is authorized to continue open water training through working dives in regular BNL diving activities, not exceeding a depth of 30 feet accompanied and supervised by a diver holding a 30-foot depth certification or greater.

b) 30-Foot Depth Certification - When a diver holding a Provisional SCUBA diver permit has logged 12 satisfactory open water dives within a depth of 30 feet the diver will receive a 30-foot depth certification. The diver thus rated may exceed 30 feet, to a maximum of 70 feet in depth accompanied and supervised by a diver holding a 70-foot depth certification or greater.

c) 70-Foot Depth Certification - When a diver holding a 30-foot depth certification has logged 12 satisfactory open water dives to depths between 30 and 70 feet, including a low air ascent from a depth of 70 feet (similar to the drill from 30 feet in the basic training course), the diver will receive a 70-foot depth certification. The diver thus rated may exceed 70 feet, to a maximum depth of 100 feet accompanied and supervised by a diver holding a **100-foot** depth certification or greater.

d) 100-Foot Depth Certification - When a diver holding a 70-foot depth certification has logged at least two open water dives between 70 and 100 feet, at least one of which shall be at a depth of 100 feet, the diver will receive a **100-foot** depth certification.

e) Surface-Supplied Air or Mixed Gas Divers - These modes of diving require a high degree of understanding, including a working knowledge of mixed-gas equipment, such as a decompression chamber, bell and mixed gas supply system and operations and emergency procedures associated with these modes of diving. Therefore certification in these modes are achieved through a combination of classroom training and field experience and generally take a year or more to achieve.

### 3. Maintenance of Certifications

a) Frequency of Dives - All divers shall be required to perform and log at least 8 open water dives in any **12-month** period. At least 2 of these **dives** will meet the following requirements: holders of the Provisional SCUBA diver permit and the 30-foot and 70-foot depth certifications will make at least one dive to the depth of their certification every six months while holders of the **100-foot** depth certification will make at least one dive at the depth of their certifications once a year, and one dive to at least 70 feet every six months.

b) Term of Certification - All diving certifications shall expire one year from the date of the last successful medical examination, or on failure to maintain the minimum degree of diving activity shown above. It shall be the individual diver's responsibility to maintain the validity of certification by arranging for an annual physical examination and by allocating time for requalifying dives.

c) Re-certification - If a diver's certificate expires, the individual may be re-certified after complying with all conditions that the Diving Supervisor may require. At the discretion of the Diving Supervisor, the diver may be certified to a lesser depth or be required to repeat part or all of the basic training program.

d) Revocation of Certification - The Diving Supervisor may revoke or restrict a diver's certificate for non-compliance with the requirements of this guide. The diver shall be given an opportunity to appeal to the Department Chairman/Division Head.

4. Diver's Health Examination. These criteria are to be used by the examining physician in evaluating an applicant's physical fitness for diving.

Clinical Evaluation: The applicant should be free of chronic disabling disease or disability. His history should be free of disease or disability of the type which would recur under diving conditions or strenuous physical activity. Any disease which might prevent active exercise should disqualify the applicant. There should be no bleeding tendency.

Ears: Individuals with acute or chronic ear infection should not dive. Scarring from otitis is not a contraindication to diving. Individuals with perforation of the drum should be disqualified. Healed perforations of the drum of at least two months duration will not be disqualifying. Special care should be taken to keep the ears well cleared during the dive. Acute or chronic otitis externa with discharge, or moderate amounts of cerumen in the external canal, should be considered harmful in diving until the canals are clear. Check **tympanic** movement with Valsalva. There should be no disease of the mastoids or disturbances in equilibrium.

Audiogram Tracing: This should be done on each applicant to rule out pre-existing hearing losses in frequency ranges which could be further impaired by diving. Damage to the drum from diving could further compromise a hearing loss. Chronic otitis externa, a common infection in divers, may thicken the ear drum and thereby increase the hearing loss. This examination should be done as a baseline and repeated every five years if diving routinely. It should be done often if injury occurs to the ears or symptoms referable to any ear structures develop.

Nose and Sinuses: Persons having acute or chronic sinus trouble should not dive unless free drainage of the sinuses is assured. Congestion, secondary to upper respiratory infection or hay fever, is a contraindication to diving until free passage of air is possible. Persons with acute upper respiratory infections may be passed, but should be strictly cautioned against diving until the upper respiratory infection has completely cleared.

Mouth and Throat: Bridgework or dentures should fit solidly. The applicant should be capable of retaining a diving mouthpiece. Acute infectious diseases of the soft tissue of the oral cavity are disqualifying until remedial treatment is completed.

Vascular: Peripheral vascular disease which might interfere with gas exchange in an extremity should disqualify the applicant. Varicose veins or hemorrhoids should be minimal or absent.

Heart: Thrust, size, rhythm, and sounds should be normal.

EKG: Divers should have on record an initial normal exercise electrocardiogram. Beyond **age 40**, an exercise electrocardiogram should be performed annually.

**Blood Pressure:** Blood pressure should not exceed 145 millimeters systolic, or 90 millimeters diastolic on repeated examinations for unrestricted diving.

**Pulse:** Pulse should be normal.

**Lungs and Chest:** Persons with evidence of chronic lung disease, interference with free air passage, or with poor gas exchange, should be disqualified. A history of asthma, with no attacks in the preceding three years, should not disqualify the applicant from diving, as long as there is no residual evidence of the disease. A vital capacity test is necessary only when the examiner is clinically suspicious of a disease. A history of pneumothorax or thoracotomy shall disqualify the applicant.

**Chest X-ray:** A report of a 14 x 17 chest x-ray, taken within 12 months prior to this physical, shall be normal and the results reported with this examination.

**Gastrointestinal:** Persons having symptomatic acute or chronic gastrointestinal disease, including ulcers, shall be disqualified.

**Serology:** Should be performed because of equipment sharing.

**Hemoglobin and Red and White Blood Cells:** Should be within normal limits.

**Blood Type and RH Factor:** Required on first examination only.

**Neuromuscular:** The applicant should be able to demonstrate fine and gross muscular coordination. Reflexes should be normal. Joints should be free from disabling arthritic conditions.

**Endocrine:** Endocrine disturbances shall disqualify the applicant.

**Neuropsychiatric:** Neuropsychiatric disturbances may disqualify the applicant. This area is obviously most difficult to evaluate. If the response of the patient to stress is questionable, seriously consider disqualifying him. Emergencies below the surface require cool judgment. The alternative is death, perhaps for others. Emotional immaturity or instability and recklessness are serious liabilities not only for the person contemplating diving, but also for his companions. Anyone exhibiting poor temperament should be disqualified. Claustrophobia, as well as other phobias, inability to tolerate face masks, accident proneness, etc., should be included as poor temperament. Screen for history of headache, dizziness, fainting spells, soaking sweats, dyspnea, palpitations, stuttering, attempted suicide, sleepwalking, **disciplinary** problems. Elicit feelings about: living in a restricted environment, possible of bodily harm, lack of privacy, separation from home and family. Observe appropriateness of emotional reactions during examination.



Alcoholism, unusual use of drugs, medicines, intoxicants, or drug addition shall disqualify the applicant.

Central Nervous System: History of syncope, epilepsy, convulsions, organic disease of the central nervous system or history of head injury with sequelae shall disqualify the applicant.

All abnormalities of the cranial nerves, deep tendon reflexes, balance, position discrimination, sensation or coordination (including gait) should be recorded in detail.

Skin: The skin should be free of active, **actute**, or chronic disease which may prove undesirable **from** the standpoint of equipment sharing.

Visual Acuity: A normal ophthalmoscopic and extra-ocular musculature examination shall be given. Although vision for distant objects underwater is often **descreased** by particualte matter in the water, and the low levels of illumination that may be encountered, the refractive changes introduced by the water environment enlarge objects by about one-fourth. The examining physician should, in each instance, determine whether the applicant's visual status is compatible with safety during diving. The following criteria may be helpful as a guide in rendering this decision:

a. Individuals with uncorrected vision of **20/50** or better for near and distant in one or both eyes, and with no evidence of organic ocular disease are unrestricted.

b. Individuals with uncorrected visual acuity of **20/50** to **20/100** for distance and the equivalent of **20/50** or better for near in one or both eyes, and with no evidence of organic ocular disease, may dive if the applicant is advised of the risks associated with the restricted vision.

c. Applicants with uncorrected vision of less than **20/100** for distance and less than **20/50** for near, in one or both eyes, and with no evidence of organic ocular disease should be restricted from diving unless optical correction worn underwater improves vision to **20/100** or better for distance, and **20/50** or better for near, in one or both eyes. These individuals should be advised of the risks associated with decreased vision.

d. Applicants with significant organic ocular disease affecting both eyes should be restricted from diving.

Height/Weight: The applicant should not be obese. His height and weight should be within the limits of the following chart:

<u>Height (inches)</u>	<u>Max. Weight</u>	<u>Height (inches)</u>	<u>Max. Weight</u>	<u>Height (inches)</u>	<u>Max. Weight</u>	<u>Height (inches)</u>	<u>Max. Weight</u>
64	164	68	184	72	205	76	230
65	169	69	189	73	211	77	236
66	174	70	194	74	218	78	242
67	179	71	199	75	224		

##### 5. Swimmer Skills

1. Breaststroke - 100 yd.
2. Sidestroke - 100 yd.
3. Crawl stroke - 100 yd.
4. Back crawl - 50 yd.
5. Swimming on back (legs only) - 50 yd.
6. Turns (front, back, side)
7. Surface dive - underwater swimming - 20 ft.
8. Disrobing, floating with clothes - 5 min.
9. Long shallow dive .
10. Running front dive
11. 10-minute swim